

INTERNATIONAL SEARCH REPORT

T/GB2004/001755

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01J31/24 C07C67/31 C07C231/18 C07F15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B01J C07C C07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 03/097569 A (PHOENIX CHEMICALS LTD ; PROCTOR LEE DAVID (GB); WARR ANTONY JOHN (GB)) 27 November 2003 (2003-11-27) the whole document	1-15
P, X	WO 03/097581 A (PHOENIX CHEMICALS LTD ; PROCTOR LEE DAVID (GB); WARR ANTONY JOHN (GB)) 27 November 2003 (2003-11-27) page 6, last paragraph - page 10, paragraph 2 ----- -/--	1-15

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

16 August 2004

Date of mailing of the international search report

02/09/2004

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>RATOVELOMANANA-VIDAL, V. ET AL: "Enantioselectivity hydrogenation of beta-keto esters using chiral diphosphine-Ruthenium complexes: optimisation for academic and industrial purposes and synthetic application" ADV. SYNTH. CATAL., vol. 345, 21 January 2003 (2003-01-21), pages 261-274, XP002290486 page 262, right-hand column - page 265, left-hand column</p> <p>-----</p>	8-14
A	<p>KING S A ET AL: "AN IMPROVED PROCEDURE FOR THE SYNTHESIS AND USE OF $\text{RuCl}_2(\text{BINAP})\cdot 2\text{NET}_3$. DEPENDENCE OF THE Ru(II)-BINAP CATALYZED ASYMMETRIC HYDROGENATION OF BETA-KETO ESTERS ON TRACE AMOUNTS OF ACID" JOURNAL OF ORGANIC CHEMISTRY, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 57, 1992, pages 6689-6691, XP001121706 ISSN: 0022-3263 page 6689 - page 6690, right-hand column, paragraph 1</p> <p>-----</p>	1-15
A	<p>KITAMURA M ET AL: "A PRACTICAL ASYMMETRIC SYNTHESIS OF CARNITINE" TETRAHEDRON LETTERS, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 29, no. 13, 1988, pages 1555-1556, XP001033752 ISSN: 0040-4039 cited in the application the whole document</p> <p>-----</p>	1-15
A	<p>GENET J P ET AL: "Enantioselective hydrogenation reactions with a full set of preformed and prepared in situ chiral diphosphine-ruthenium(II) catalysts" TETRAHEDRON: ASYMMETRY, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 5, no. 4, 1994, pages 675-690, XP002249781 ISSN: 0957-4166 page 681, paragraph 1 page 682, paragraph 1 page 683 - page 688; tables 5,6,5-2</p> <p>-----</p> <p style="text-align: center;">-/--</p>	1-15

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>ZHOU Y-G ET AL: "HIGHLY EFFECTIVE CHIRAL ORTHO-SUBSTITUTED BINAPO LIGANDS (OMICRON-BINAPO): APPLICATIONS IN RU-CATALYZED ASYMMETRIC HYDROGENATIONS OF BETA-ARYL-SUBSTITUTED-BETA-(ACYLAMINO)ACRYLATES AND BETA-KETO ESTERS" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, DC, US, vol. 124, 8 March 2002 (2002-03-08), pages 4952-4953, XP001106877 ISSN: 0002-7863 the whole document</p>	1-15

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 1-15 (partly)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-15 (partly)

Present claim 1 relates to a catalytic composition comprising an acidic material which acidic material, according to claim 4, comprises 'a substrate for asymmetric hydrogenation'. This means that the catalytic composition of claim 1 comprises one of the reactants, which is in contradiction with the general knowledges that a catalyst does not take part in a reaction and therefore, claim 1 lacks clarity within the meaning of Article 6 PCT.

Lack of clarity also arises for claim 8 which relates to a hydrogenation process which comprises contacting a substrate with hydrogen and a catalyst in the presence of an acidic material and a buffering compound, whereby according to claim 11 the acidic material comprises 'a substrate suitable for asymmetric hydrogenation assisted by the catalyst'.

Moreover, a hydrogenation process according to claim 8 taking place in the presence of an acidic material is not supported by the description/examples.

Independently from the above reasoning, claims 1, 8 and 15 further lack clarity (Article 6 PCT), because an attempt is made to define the catalytic composition / the hydrogenation process / the use of the buffering composition by reference to a result to be achieved due to the expressions "catalyst effective for catalysing", "acidic material effective for activating the catalyst", "under condition effective for enantioselective hydrogenation", "in the presence of an effective catalyst", "acidic material for effecting such activation".

The claims thus cover all compositions /processes having these characteristics or properties, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such compositions/processes. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible.

Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to a catalytic composition according to claim 1 for the enantioselective hydrogenation of beta-ketoesters as defined in claim 3 comprising a catalyst as defined in claim 2 and a buffering composition comprising a mixture of a ketone/or an aldehyde and an alcohol as defined in the description on page 4, line 27 - page 5, line 3. For the same reasons the process according to claim 8 and the use claim 15 were restricted to the features of claims 9 and 10 with the buffering composition restricted as above and without taking in account the presence of an acidic material.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

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Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 03097569	A	27-11-2003	WO 03097569 A1 GB 2389109 A , B	27-11-2003 03-12-2003
WO 03097581	A	27-11-2003	WO 03097581 A1 GB 2389110 A , B	27-11-2003 03-12-2003